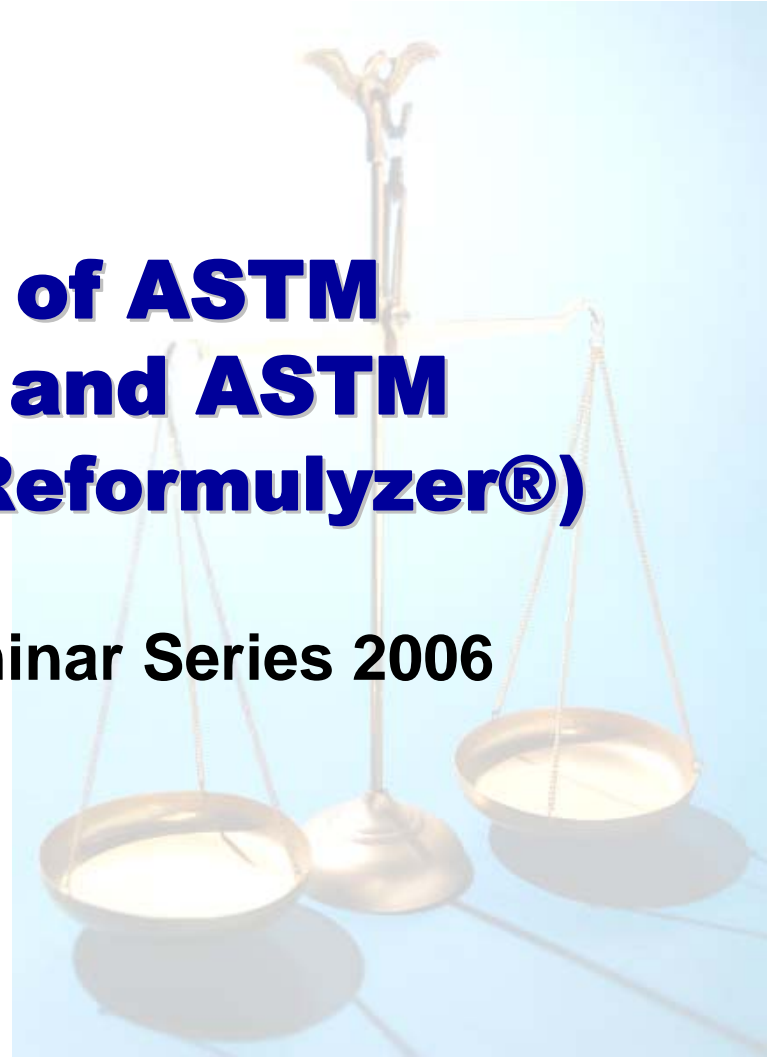
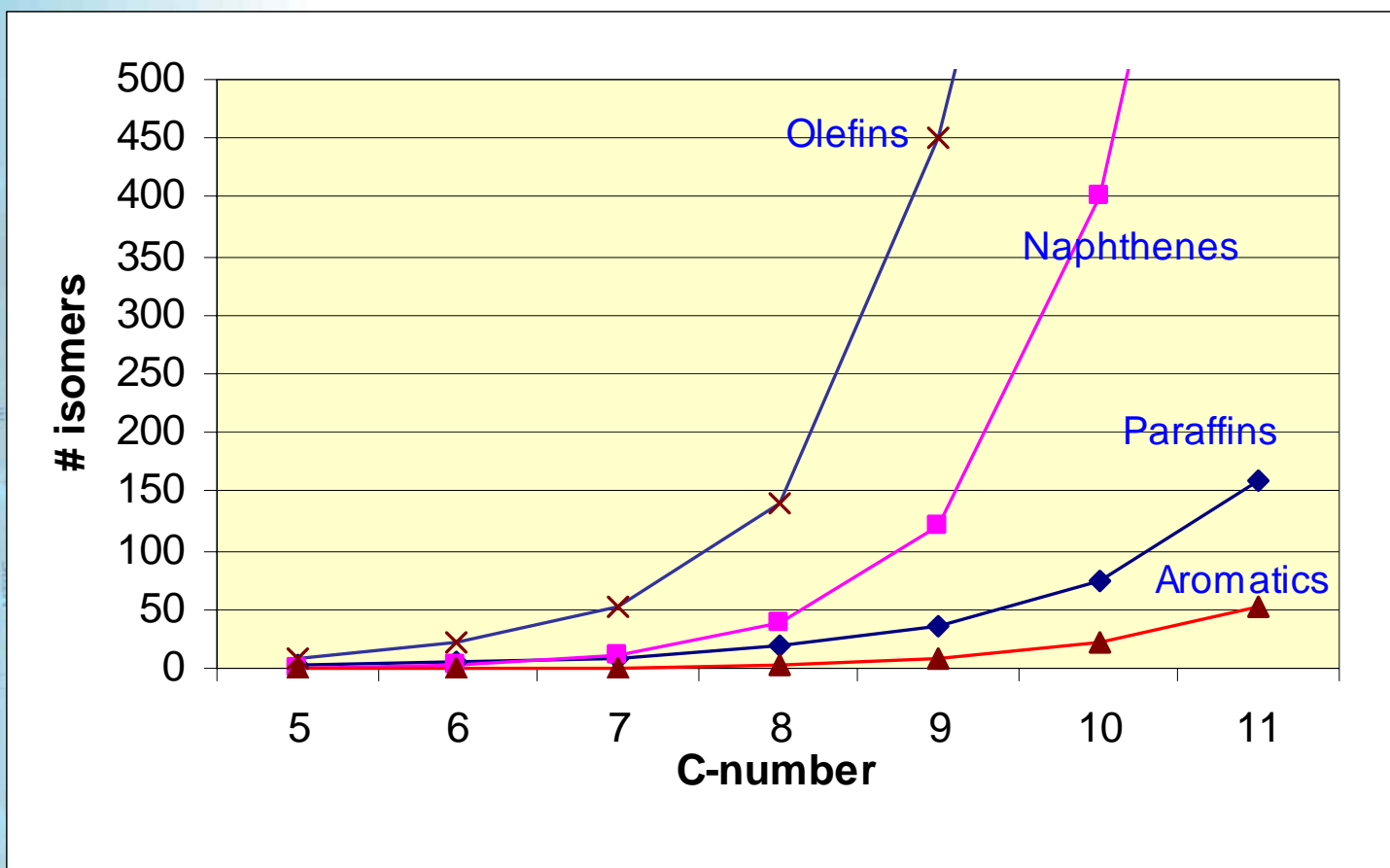


Comparison of ASTM D 6730 (DHA) and ASTM D 6839 (PIONA/ Reformulyzer®)

25th Anniversary Seminar Series 2006



Number of Possible Hydrocarbons



Individual Components

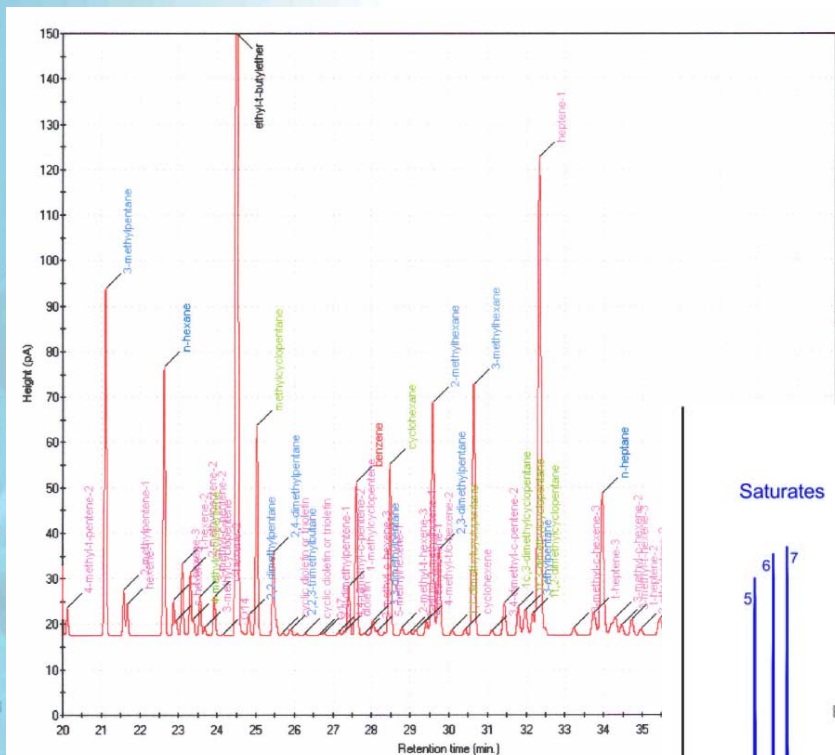
1961	Packed Columns	C3 – C9	122 peaks
1968	Glass Capillary	Naphtha's	240 peaks
1979	Fused Silica	Naphtha's	380 peaks
1996	Fused Silica	Gasoline	900+ peaks



Hydrocarbon Type/Carbon

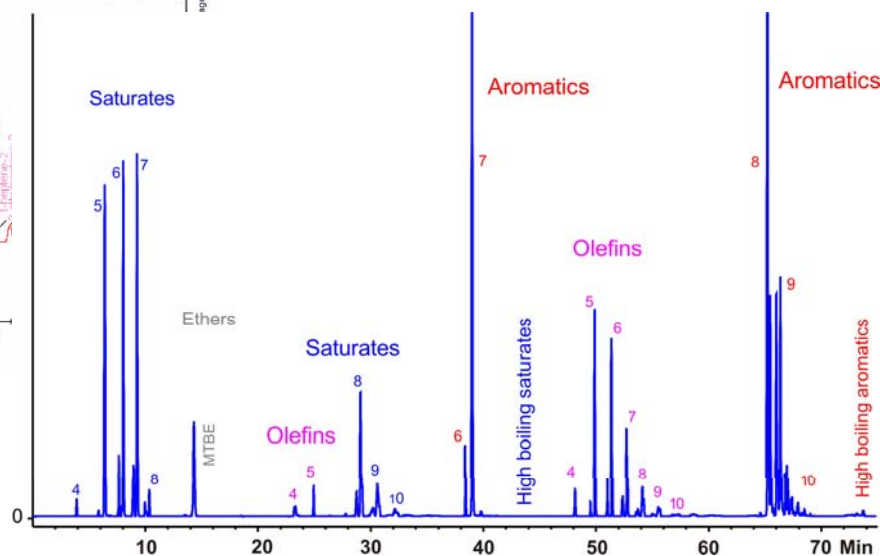
1965	TCEP	Aromatics
1968	Molsieve 13X	Paraffins/Naphthenes
1970	Molsieve 5A	Iso/n-paraffins
1983	Irreversible adsorption	Olefins
1985	Reversible adsorption	Olefins
1992	Reversible adsorption	Oxygenates

Chromatograms



DHA

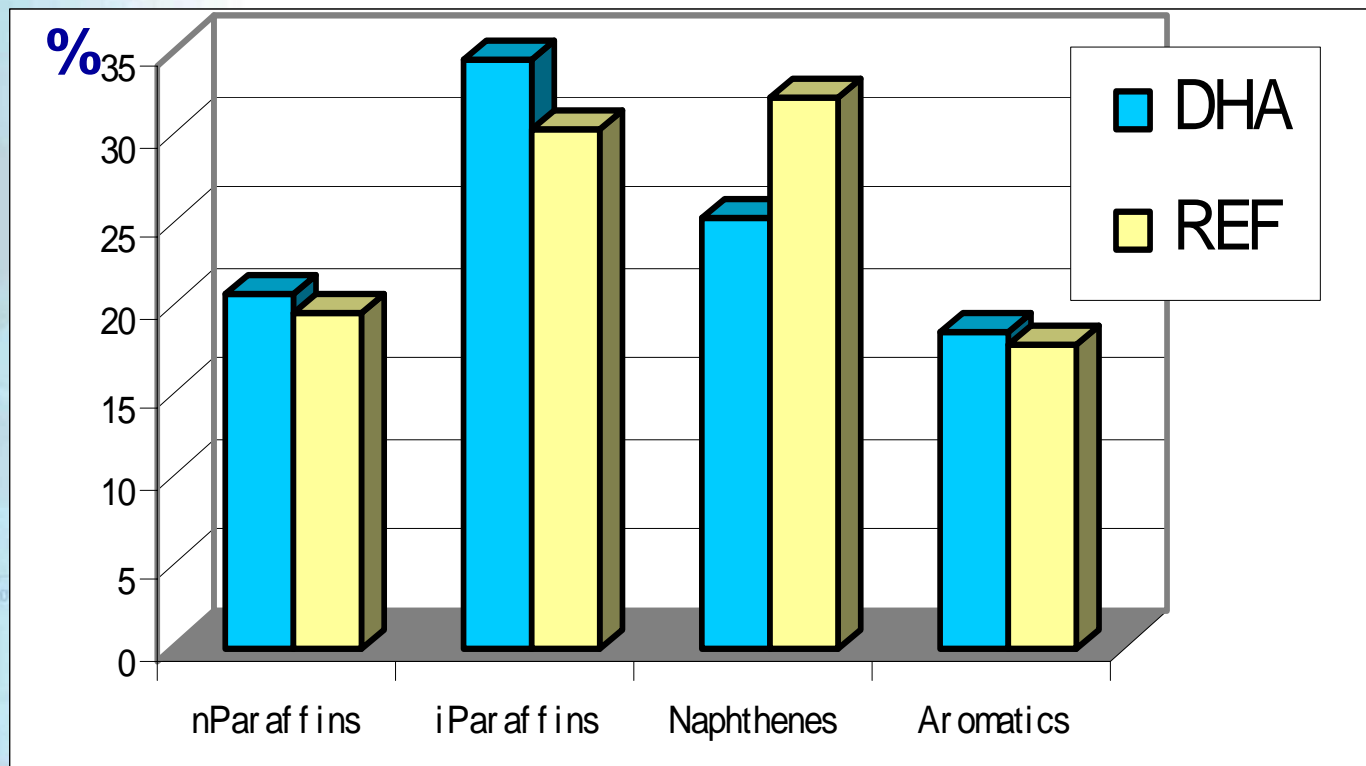
Reformulyzer



Reformer Feed (HSR)

Composition:

n,i-Paraffins, Naphthenes, Aromatics (incl. Benzene)



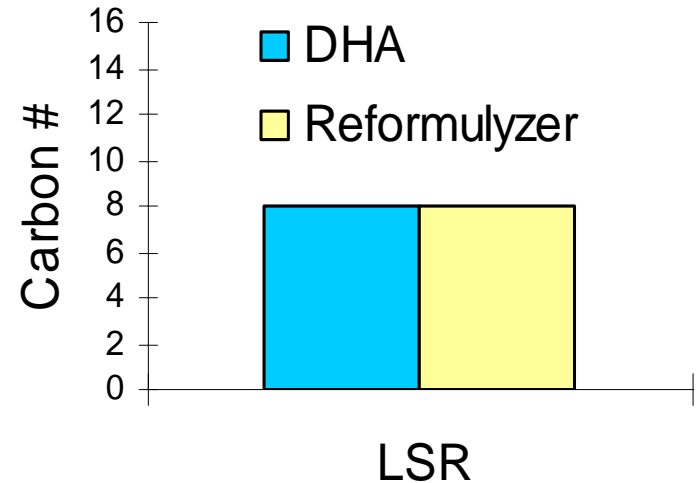
Light Straight Run

DHA

The DHA separation and identification of LSR is highly reliable.

Reformulyzer

PNA, PiPNA and PIANO mode can be used to determine the hydrocarbon types in LSR.



A light straight run is a saturated naphtha with a boiling range of 30-100 °C consisting of C4 - C8 hydrocarbons.

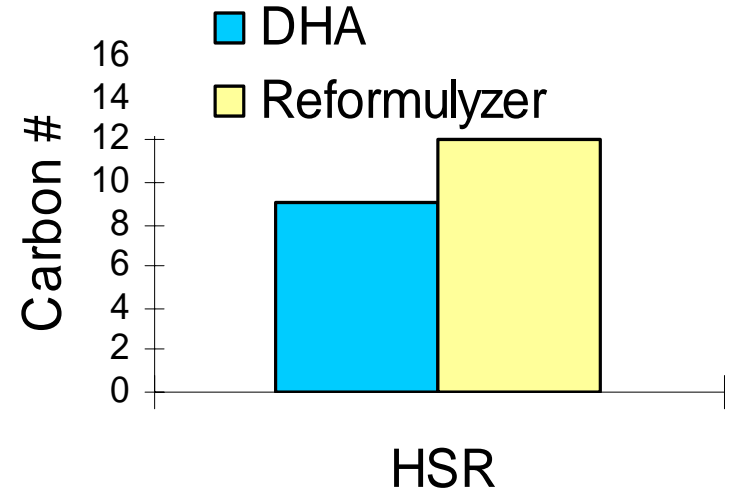
Heavy Straight Run

DHA

Due to the high amount of high boiling isomers, DHA does not provide a complete separation on the capillary column.

Reformulyzer

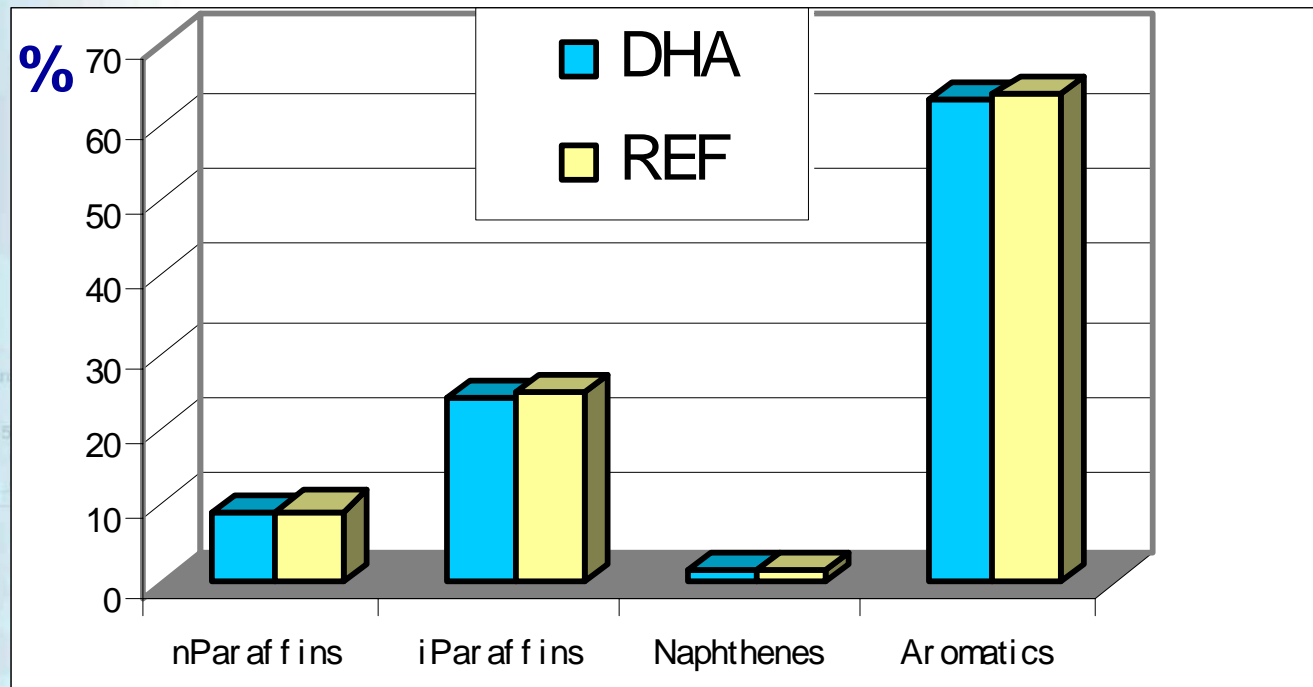
The PNA, PiPNA and PIANO mode can very well be used to determine the hydrocarbon types.



A heavy straight run is a saturated naphtha with a boiling range of 60 - 185 °C consisting of C5 - C12 hydrocarbons, that includes a large number of isomers, especially naphthenes.

Reformate

Composition:
n,i-Paraffins, Naphthenes, Aromatics
(incl. Benzene), Olefins



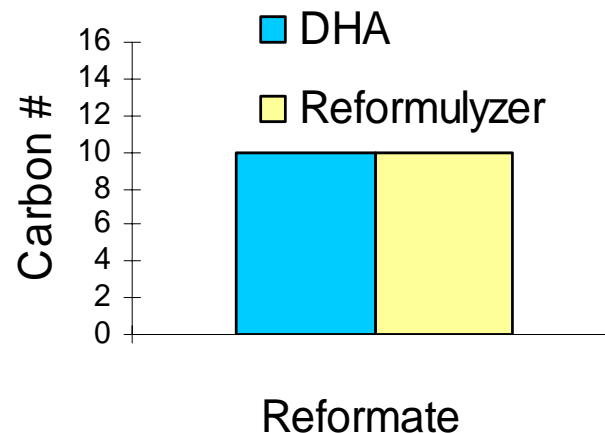
Reformate

DHA

The DHA analysis provides a complete separation and identifies the components

Reformulyzer

The PNA and PIANO modes provide an accurate hydrocarbon type classification per carbon number.

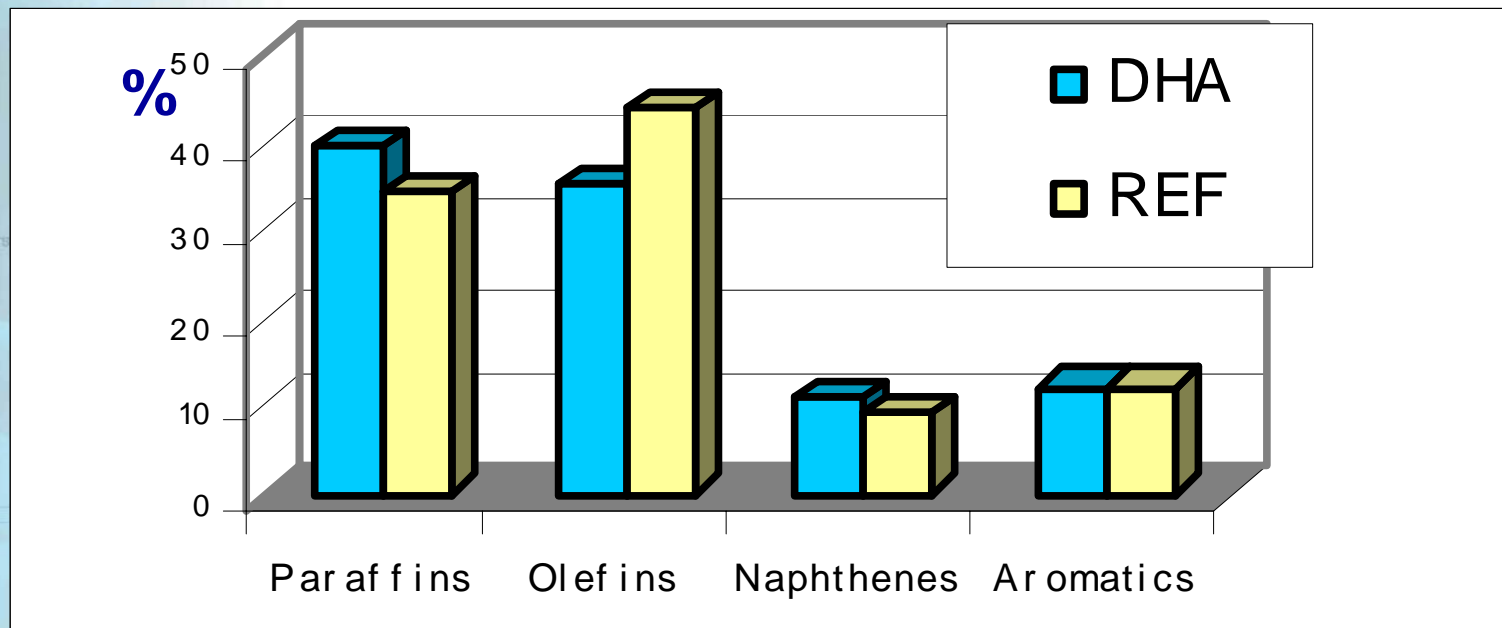


Reformate is a converted naphtha that consists of paraffins, some naphthenes, aromatics and small amounts of olefins. The carbon number range of reformate consists of C4 - C10 hydrocarbons and some naphthalenes. The boiling range is 30 - 185°C.

FCC Naphtha

Composition:

Paraffins, Naphthenes, Aromatics (incl. Benzene),
Olefins



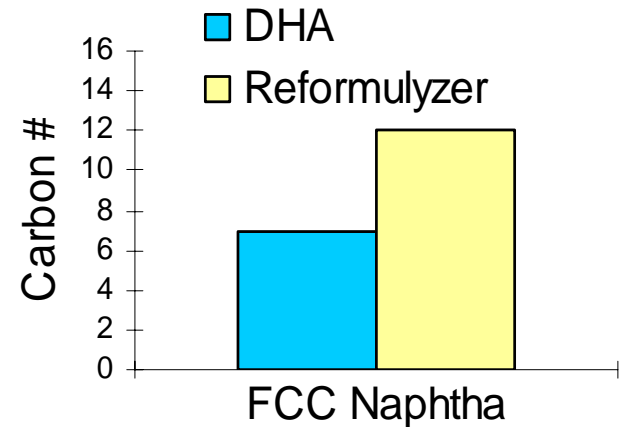
FCC Naphtha

DHA

The capillary column is not able to separate all individual components; the identification is not reliable for components above toluene.

Reformulyzer

The PHONA mode provides correct carbon number/ hydrocarbon type information.

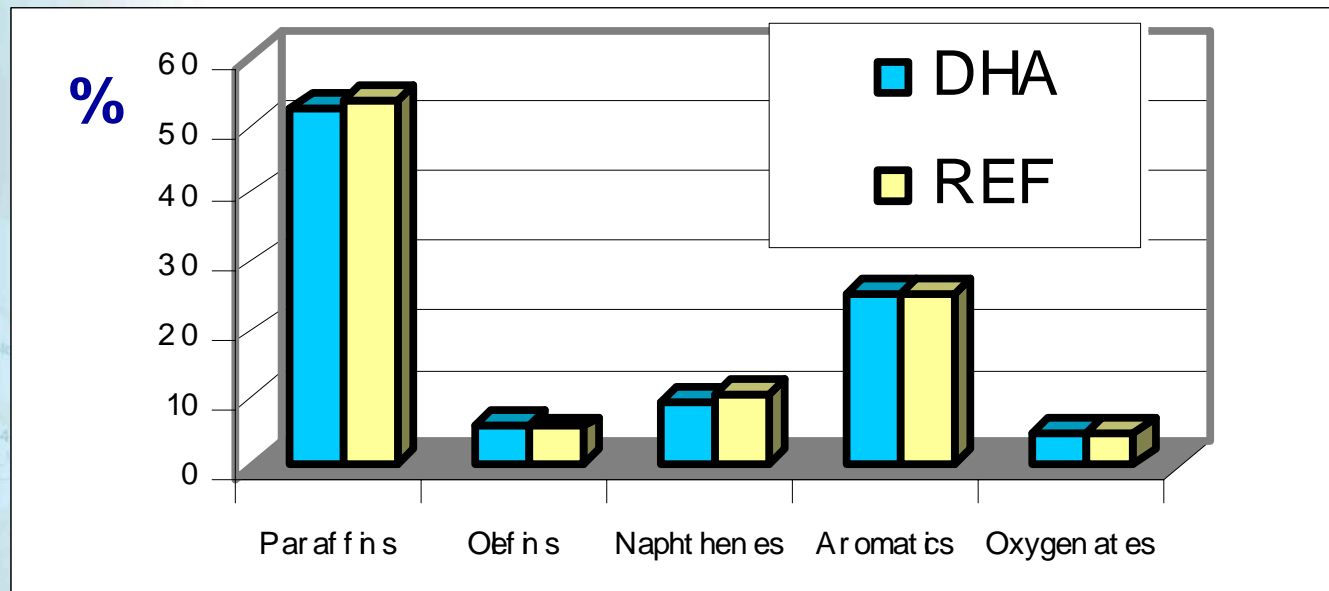


The FCC naphtha is unsaturated and consists of paraffins, naphthenes, olefins and aromatics with a carbon number range of C4 -C12. The boiling range is 30 - 200 °C.

Gasoline + Ethanol

Blended from:

Reformate, Isomerate, Alkylate, FCC, Oxygenate, Reformer Feed



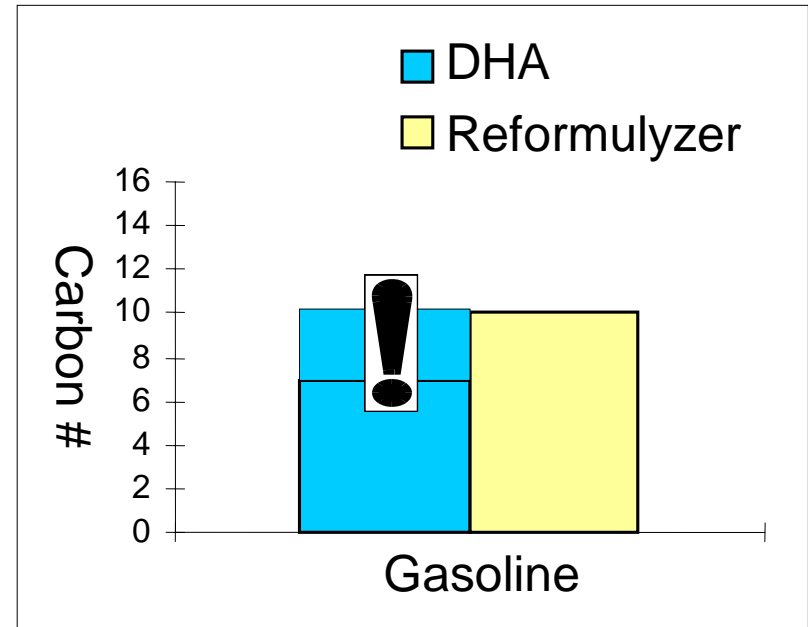
Finished Gasoline

DHA Analysis

If the gasoline is blended from saturates and one or two oxygenates, DHA provides sufficient data. If the blend contains olefins, the DHA data is only reliable up to toluene.

Reformulyzer

ASTM D 6893 provides the required data for both environmental regulations and process control.



Finished gasoline is a hydrocarbon blend of paraffins, naphthenes, olefins, aromatics and possibly some oxygenates. The boiling range is 30 -185°C and the carbon number range is C4 - C10.

Sample Scope

	DHA	Multi-Dimensional
Straight Run	+	+
FCC	--	+
Reformate	+	+
Isomerase	+	+
Alkylate	+	+
Oxygenates	+	+
Gasoline	--	+

Application Comparison

	DHA	Multi-Dimensional
Standard Method	D 6729, D 6730, D 6733, D 5134	D 6839, EN 14517, D 6293
Analysis Time	120 – 150 min 28 min on fast DHA	75 min for Winterspec mode
Columns	1 or 2	7 (including traps)
User Group	Not planned	Yes
Crude Oil	Yes, light end in crude analysis (combi design)	No, FBP is 275°C/527°F

Application Comparison

DHA	Multi-Dimensional
Individual Components	Benzene, Toluene, Oxygenates
Group-type	Group-type
RON	RON
Mol.Weight	Mol.Weight
Specific Gravity	Density
TBP	<ul style="list-style-type: none"> • C:H:O ratio • Cal.Value

Conclusions

- Both DHA & Reformulyzer are suitable for analyzing refinery streams
- DHA is recommended when mainly detailed information is needed at component level
- Reformulyzer is required when samples containing higher amounts of Olefins and/or Naphthenes above C7 – 8 are present in the sample

Questions

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